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THE

ONTARIO WATER RESOURCES

COMMISSION

WATER POLLUTION SURVEY

of the

TOWN OF PEMBROKE

COUNTY OF RENFREW

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TOWN OF PEMBROKE - 1964
COUNTY OF RENFREW

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Report on a water pollution
survey of the town of Pembroke
in the county of Renfrew.

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THE
ONTARIO WATER RESOURCES
COMMISSION

Report on a
WATER POLLUTION SURVEY

of the
TOWN OF PEMBROKE

in the
COUNTY OF RENFREW

Division of Sanitary Engineering

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WATER POLLUTION SURVEY

of the

TOWN OF PEMBROKE

INDEX

PAGE NO.

INTRODUCTION	1
TOWN OF PEMBROKE - General	2
Water Supply	2
Sewer System & Sewage Works	2
Private Sewage Disposal	3
Industry	4
Recreation	5
SAMPLING PROCEDURE	5
INTERPRETATION & SIGNIFICANCE OF LABORATORY RESULTS	6
SAMPLE RESULTS	7
POLLUTION SOURCES	8
SUMMARY	9
RECOMMENDATIONS	9

APPENDICES

River Samples and outfalls pertaining to the Ottawa River

River Samples and outfalls pertaining to the Muskrat and
Indian River

Map of the Town of Pembroke

WATER POLLUTION SURVEY

of the

TOWN OF PEMBROKE

INTRODUCTION

A water pollution survey was performed in the Town of Pembroke during the week of June 27, 1964. Subsequent inquiries were made during February, 1965. Water pollution surveys are conducted by the Ontario Water Resources Commission for the purposes of locating and recording sources of existing and potential pollution of watercourses. Enquiries and investigations are made with respect to outfalls which discharge to local watercourses and samples are collected to determine the significance of the outfalls and their effects on the receiving streams. Where pollution sources are noted, recommendations are made concerning their abatement to the parties concerned.

Valuable assistance was received from the following officials:

Mr. S. A. Thomson, Town Clerk;
Mr. R. G. Rhodes, Town Engineer;
Mr. J. Watt, Chief Public Health Inspector,
Renfrew County Health Unit;
Mr. N. G. Whitaker, Public Health Inspector;
Mr. C. R. Groves, Timber Supervisor, Ontario
Department of Lands & Forests,
Pembroke.

It is noted that the comments in this report pertain to conditions as they existed at the time of the survey.

A map of the Town of Pembroke showing sampling point locations is appended for reference.

TOWN OF PEMBROKE

General

The Town of Pembroke, the county seat of the County of Renfrew is located on the south shore of the Ottawa River at the junction of Highways 17, 41 and 62. According to the 1964 Municipal Directory, the assessed population is 17,628.

The Indian River empties into the Muskrat River, which discharges to the Ottawa River near the centre of the town.

Water Supply

The municipal water works pumping station is located near the western limit of the town. The water as obtained from the Ottawa River is afforded screening and chlorination prior to being pumped to the distribution system.

Sewer Systems and Sewage Works

Existing

Storm sewers are provided. The majority of these sewers discharge to the Indian and Muskrat Rivers and to local ditches, which in turn empty into the Ottawa River. In some cases the storm sewers carry combined sanitary and storm water flows.

The town is served by a network of sanitary sewers, from which the flows are discharged via six submerged outfalls and without the benefit of treatment to the Ottawa River. The outfalls terminate at the approximate locations as shown on the map. Also noted on the map are the sewage pumping stations and their relief sewer outfalls.

The sanitary sewer system extends into the urbanized

area of the Township of Stafford, located south of Boundary Road (Hwy. 41) and adjacent to Bruham Ave. (Hwy. 62).

Proposed

The municipality has embarked upon a capital budget programme which embodies complete sewage works construction from 1962 to 1969. The programme outlined indicates the initial construction of a water pollution control plant, the first stage of which is to be built in 1968, with completion in 1969.

The Commission has been desirous of obtaining an accelerated sewage works programme. It is noted that the town during 1964 allocated \$20,000 towards the cost of a preliminary engineering report on sewage works. In 1965 an additional \$125,000 was allotted for further phases of the sewage works programme.

It was recently learned that Council has under consideration a plan to take advantage of the Federal loans and subsidies plan which is available for work completed before April of 1967. The town's consulting engineering firm is being authorized to design the sewer outfall to the sewage treatment plant and also to conduct soil testing at the sewage treatment plant site.

Private Sewage Disposal

In some areas of the town, private sewage disposal procedures are employed. Reportedly, pollution of the local watercourses may occur, especially in the south Moffat Street area, from malfunctioning septic tank systems. The extent

of this pollution, could be determined only by individual testing of these systems.

A number of private dwellings located on Pumphouse Lane have domestic waste discharges to the ditch extending along this street. This ditch eventually discharges to the Ottawa River. It is designated on the map as sample point number 0.243.0-D.

Industry

The following principal industries are located in the Town of Pembroke.

<u>Name of Firm</u>	<u>Product</u>
Andersons Home Bakery	Baked Goods
Barrymore Cloth Company	Weave Cloth
Brumm's Dairy	Milk Products
Canadian Splint and Lumber Corp. Ltd.	Wood Splints
Canada Veneers Limited	Veneers and Plywood
John Cockburn	Boat Building
Consolidated Paper Corp. Ltd.	Lumber
Eddy Match Company	Matches
F.W. Fishcher & Son	Planning Mill
Forest Valley Lumber	Planning Mill
Hoffman's Concrete Products	Concrete Blocks
H. Kutschke & Son Limited	Lumber and Logging
Producers Dairy	Dairy Products
Pembroke Shook Mills Limited	Wood Shook & Corrugated Containers

During 1958, the Industrial Wastes Branch of the Commission carried out an industrial wastes survey within the town. With the exception of certain dry industries, reports were made on the major firms indicating the processes used and the instances of liquid wastes. It was generally noted that the foremost industries in the town were concerned with wood products and the processes carried out at these types of plants did not result in contaminated industrial

wastes. It was noted, however, that wastes resulting from a rinse tank in a local plating firm, Superior Electrics Limited, were discharged to a plant drain. During the present survey, it was reported that the plating room had been moved in 1962, and a connection secured to the sanitary sewer.

The industrial waste survey also noted the occasional discharge of glue machine washings to the sewer from the Canada Veneers Limited plant. This plant was visited in conjunction with this survey and in response to complaints regarding the industrial waste disposal procedures employed. The observations and recommendations are outlined in a separate report, as well as being listed in this report for reference.

The industrial waste survey of 1958 recommended that all waste water from industries be accepted in the sanitary sewers for treatment at the proposed sewage disposal plant provided no process changes resulting in objectionable waste or increased effluent volumes occurred.

Recreation

Sporadic use may be made of the Muskrat and Indian Rivers for swimming. Riverside Park, located on the Ottawa River in the west end of town is presently undergoing considerable development. It is expected that this area will be used extensively for swimming during the coming year.

SAMPLING PROCEDURE

Samples were collected from the Muskrat, Indian, and Ottawa Rivers, and from evident discharges to the watercourses. Bacteriological examination and sanitary chemical

analysis were performed at the OWRC laboratory in Toronto. The sample results are recorded in the appendices to this report. Seasonal weather conditions prevailed during the sampling period.

INTERPRETATION AND SIGNIFICANCE OF LABORATORY RESULTS

Bacteriological Examination

The Membrane Filter Technique is employed to obtain a direct enumeration of coliform organisms and is reported per 100 millilitres (ml) of the sample. The presence of coliforms indicates pollution from human or animal excrement, or from some non-faecal forms. The maximum limit of 2,400 coliform organisms per 100 millilitres is the OWRC objective for bacteriological quality of surface water in Ontario.

Sanitary Chemical Analyses

Biochemical Oxygen Demand (BOD)

The BOD of sewage, industrial wastes or polluted waters, is the oxygen required during stabilization of the decomposable organic material by aerobic biochemical action. A 5-day BOD determination with incubation at 20 degrees Centigrade is reported. A high BOD is indicative of organic or chemical pollution. The Commission objective for surface water quality is an upper limit of four (4) parts per million (ppm).

Solids

The value for total solids, expressed in parts per million (ppm), is the sum of the values for the suspended and dissolved matter in the water. Concentration of suspended

solids, which indicates the measure of undissolved solids of organic or inorganic nature is generally the most significant of the solids analyses in regard to surface-water quality. The effects of suspended solids in water are reflected in difficulties associated with water purification, deposition in streams, and injury to the habitat of fish.

Listed below are some of the pertinent maximum allowable concentration limits of contaminants in storm sewer, sewage treatment plant, and industrial waste discharges. Adequate protection of surface waters, except in certain specific instances influenced by local conditions, should be provided if the following concentrations and pH range are not exceeded.

5-day BOD	15 ppm
Suspended Solids	15 ppm
Phenol	20 ppb
Iron	17 ppm
Oil (Ether Solubles)	15 ppm
pH range	5.5 to 10.6

SAMPLE RESULTS

With respect to the Ottawa River, satisfactory results were obtained in the sample taken at the water works; however, the sample taken at the foot of Arnold Lane, which is downstream of the sanitary sewer outfalls, showed a coliform count in excess of this Commission's objective for surface water.

The slightly high coliform count obtained in the sample from the ditch on the north side of Water Street may be attributed to surface runoff and stagnant water.

Satisfactory conditions with respect to sanitary quality of the water were noted in the upstream section of

the Muskrat River; however, a deterioration of the water quality is evidenced in the rising coliform counts as it passes through the town. Similarly, a coliform count far in excess of the Commission's objectives is noted in the Indian River at its mouth. This deterioration of water quality is mainly attributed to the discharge of inadequately treated wastes from several municipal storm sewers.

POLLUTION SOURCES

Sanitary Waste Outfalls

The obvious main source of water pollution in the Town of Pembroke is the six submerged outfalls which discharge untreated sanitary wastes to the Ottawa River.

Municipal Storm Sewer Outfalls

Excessive BOD and coliform counts indicate the presence of inadequately treated sanitary wastes in the following storm sewer discharges.

Sample Point Number

Description

M 0.05-W	Submerged sewer to the east bank of the Muskrat River, south side of Nelson Street (area sample).
M 0.8 (W)	Storm sewer to the east bank of the Muskrat River at the foot of Morris Street.
MI 2.1-W	Storm sewer outfall to the west bank of the Indian River at the foot of D'Arcy Street.
MI 2.3-W-2	Storm sewer outfall to the south bank of the Indian River on the east side of Christie Street.

Private Outfalls

Private dwellings located on Pumphouse Lane discharge

domestic waste to a ditch which outfalls to the river. This is immediately upstream of the Riverside Park swimming area, and could conceivably create considerable pollution problems.

Industrial

A high BOD and suspended solids concentration was noted in the sample taken from the discharge from the Canada Veneers Limited plant. In addition to the liquid waste, concern has been expressed over wood chippings and sawdust which have accumulated at the rear of the plant. Several hundred feet of this wood waste is piled some 50-60 feet high along the river's edge. In all likelihood, continued dumping in this area would result in the waste gaining access to the river. It is conceivable that during periods of high water, shavings have been washed into the river. Shavings, which were apparently being used as a reinforcement for a dam, were noted in the water at the time of this investigation.

SUMMARY

The main sources of pollution within the Town of Pembroke are the municipal sanitary sewer outfalls and a number of municipal storm sewer outfalls. Some industrial waste pollution is also noted.

RECOMMENDATIONS

1. Efforts by the Town of Pembroke should be continued towards the provision of sewage treatment works at the earliest possible date.
2. The source of the inadequately treated wastes in the storm sewers, such as private connections or interconnections

between storm and sanitary sewers, should be located and eliminated.

3. The sources of pollution to the ditch on pump-house lane should be eliminated. This could be accomplished either by private means or the extension of a municipal sewer to the area.

4. Active consideration should be given to the aforementioned recommendation that all wastes from certain industries be accepted into the sanitary sewers for treatment at the proposed sewage treatment plant.

The following recommendations concern the Canada Veneers Limited plant:

(1) Effective treatment should be provided for the glue-machine waste, so that the Commission's objective for waste discharge will not be exceeded.

(2) An alternative method of disposal of wood shavings and sawdust such as hauling away or burning should be employed.

(3) Consideration should be given to the construction of a suitable retaining wall to contain the existing waste during periods of high water.

(4) Wood shavings should not be used as a reinforcement for the dam.

All of which is respectfully submitted,

District Engineer:


J. K. Theil

Approved by:


K. H. Sharpe, Director

Prepared by: M. Holy
/mh

RIVER SAMPLES AND OUTFALLS PERTAINING TO THE OTTAWA RIVER

ALL ANALYSES ARE REPORTED IN PPM
UNLESS OTHERWISE INDICATED.

SAMPLE POINT NUMBER	DATE	DESCRIPTION	5-DAY BOD	S O L I D S			TOTAL COLIFORMS PER 100 ML
				TOTAL	SUSP.	DISS.	
0.241.3	1964 JUNE 24	OTTAWA RIVER AT THE FOOT OF ARNOLD LANE	1.2	108	10	98	21,000
0.241.5-D	JUNE 24	DITCH WHICH DISCHARGES TO THE OTTAWA RIVER AT THE FOOT OF ELIZABETH STREET		N O F L O W			
0.242.1	JUNE 24	OTTAWA RIVER AT THE FOOT OF ALBERT STREET	0.5	84	7	77	530
0.242.5-D	JUNE 24	DITCH ON NORTH SIDE OF WATER STREET	0.7	610	12	598	3,700
0.242.7-D	JUNE 24	DITCH AT JUNCTION OF PEMBROKE ST. & C.P.R. RIGHT-OF-WAY		N O F L O W			
0.242.9-D	JUNE 24	DITCH AT EAST SIDE OF THE MUNICIPAL PARK	1.4	414	10	404	600
0.243.0-D	FEB. 1/65	DITCH EXTENDING ALONG PUMPHOUSE LANE WHICH DISCHARGES TO OTTAWA RIVER		FREEZING CONDITIONS- N O S A M P L E			
0.243.0-W	JUNE 24	STORM SEWER WHICH DISCHARGES TO A DITCH AT THE WEST SIDE OF THE MUNICIPAL PARK		N O F L O W			
0.243.0	JUNE 24	OTTAWA RIVER AT PEMBROKE WATER WORKS	0.7	82	8	74	40

RIVER SAMPLES AND OUTFALLS PERTAINING TO THE MUSKRAT & INDIAN RIVERS

ALL ANALYSES ARE REPORTED

IN PPM UNLESS OTHERWISE INDICATED

SAMPLE POINT NUMBER	DATE 1964	DESCRIPTION	5-DAY	S O L I D S			TOTAL COLIFORMS PER 100 ML
			BOD	TOTAL	SUSP.	DISS.	
M. 0.0	JUNE 24	MUSKRAT RIVER AT OTTAWA RIVER	1.1	144	6	138	4,900
M. 0.0-W	JUNE 24	SEWER OUTFALL TO EAST BANK OF MUSKRAT RIVER AT FOOT OF JOSEPH STREET	0.6	816	10	806	100
M. 0.05-W	JUNE 24	SUBMERGED SEWER TO THE EAST BANK OF MUSKRAT RIVER, SOUTH OF NELSON ST. (AREA SAMPLE)	54	296	50	246	6,100,000
M. 0.06-W	JUNE 24	SEWER OUTFALL TO WEST BANK OF MUSKRAT RIVER SOUTH SIDE OF NELSON STREET			N O F L O W		
M. 0.2	JUNE 24	MUSKRAT RIVER AT HIGHWAY 17	0.9	132	3	129	2,500
M. 0.2-W	JUNE 24	STORM SEWER TO THE WEST BANK OF THE MUSKRAT RIVER, SOUTH SIDE OF PEMBROKE STREET			N O F L O W		
M. 0.3-W	JUNE 24	STORM SEWER OUTFALL TO WEST BANK OF MUSKRAT RIVER AT FOOT OF ISABELLA STREET			N O F L O W		
M. 0.4	JUNE 24	MUSKRAT RIVER AT ALFRED STREET	0.9	136	9	127	830
M. 0.4-W	JUNE 24	STORM SEWER TO THE EAST BANK OF MUSKRAT RIVER, NORTH SIDE OF ALFRED STREET	0.7	756	4	752	2,900
M. 0.6-W	JUNE 24	STORM SEWER TO WEST BANK OF MUSKRAT RIVER AT MARGARET STREET			N O F L O W		
M. 0.8-W	JUNE 24	STORM SEWER TO EAST BANK OF MUSKRAT RIVER AT THE FOOT OF MORRIS STREET	49	258	53	205	34,000,000
M. 1.1-I	JUNE 24	OUTFALL FROM CANADA VENEERS PLANT	102	474	190	284	
M. 1.2	JUNE 24	MUSKRAT RIVER AT CANADA VENEERS DAM	1.3	154	5	149	420
M. 1.4	JUNE 24	MUSKRAT RIVER AT TOWN LINE	1.4	168	7	161	500
M. 1.4-W	JUNE 24	STORM SEWER OUTFALL TO WEST BANK OF MUSKRAT RIVER, NORTH SIDE OF TOWN LINE BRIDGE			N O F L O W		
M. 2.0	JUNE 24	MUSKRAT RIVER AT BASELINE, PEMBROKE TWP.	1.2	152	2	150	120
M. I. 1.1	JUNE 24	INDIAN RIVER JUST ABOVE JUNCTION WITH MUSKRAT RIVER	1.3	90	11	79	60,000
M. I. 1.3-W	JUNE 24	STORM SEWER OUTFALL TO SOUTH BANK OF INDIAN R. NORTHWEST CORNER OF EVERETT & ALMIRA ST.			N O F L O W		
M. I. 2.0-W	JUNE 24	STORM SEWER OUTFALL TO WEST BANK OF INDIAN RIVER JUST ABOVE MILLER STREET			N O F L O W		
M. I. 2.1-W	JUNE 24	STORM SEWER OUTFALL TO WEST BANK OF INDIAN RIVER AT FOOT OF D'ARCY STREET	15	858	564	294	7,900,000
M. I. 2.2-W	JUNE 24	SUBMERGED OUTFALL TO INDIAN RIVER AT THE FOOT OF MURRAY ST. (AREA SAMPLE)	0.8	90	8	82	4,700
M. I. 2.3-W-1	JUNE 24	STORM SEWER OUTFALL TO NORTH BANK OF THE INDIAN RIVER, WEST SIDE OF CHRISTIE ST.			N O F L O W		
M. I. 2.3-W-2	JUNE 24	STORM SEWER OUTFALL TO SOUTH BANK OF THE INDIAN RIVER, EAST SIDE OF CHRISTIE ST.	9.8	194	19	175	3,400,000
M. I. 3.0	JUNE 25	INDIAN RIVER AT BASELINE, PEMBROKE TOWNSHIP	0.4	84	5	79	970